Notes - Working with Radicals

- Radical is a root $\sqrt{}$ (square root), $\sqrt[3]{}$ (cube root), $\sqrt[4]{}$ (4th root), $\sqrt[n]{}$ (nth root)

- Radicals undo exponents

  Ex: $\sqrt{v^2} = v \qquad \sqrt[7]{2^7} = 2$

- Radicals are fractional exponents

  $\sqrt[2]{L^1} = L^{\frac{1}{2}}$ inside exponent → top
  root → bottom

  $\sqrt[3]{5^1} = 5^{\frac{1}{3}} \qquad \sqrt[6]{a^5} = a^{\frac{5}{6}}$

Solving Equations with Radicals

Ex: $\left(\sqrt{n-3}\right)^2 = (4)^2$

Check: $\sqrt{19-3} = \sqrt{16} = 4$ ✓

$$n - 3 = 16$$
$$+3 \qquad +3$$

$n = 19$

Ex: $2\sqrt[3]{x} + 1 = 7$

$$-1 \qquad -1$$

$$\frac{2\sqrt[3]{x}}{2} = \frac{6}{2}$$

$$\left(\sqrt[3]{x}\right)^3 = (3)^3$$

$$x = 3^3 = 27$$

Even exponents $(\ )^2 = +$ $(\ )^4 = +$ $(\ )^{\text{even}} = \text{positive}$

Odd exponents $(+)^3 = +$ $(-)^3 = -$ > Can have both positive and negative answers

$\Rightarrow$ Can't take an even root ($\sqrt{\ }$, $\sqrt[4]{\ }$, $\sqrt[2n]{\ }$) of a negative number

BUT I can take an odd root of a negative

$\sqrt[\text{even}]{\ } = \text{negative}$ $\Rightarrow$ no real solution

$\sqrt[\text{odd}]{\ } = \text{negative}$ $\Rightarrow$ solve it!